

In the Claims

The following Listing of Claims replaces all prior versions in the application:

LISTING OF CLAIMS

1. (Previously presented) An ultrasonic contact transducer with multiple elements, said transducer comprising:

means for bringing the elements into contact with the surface of an object to be checked; and

means for determining the positions of the multiple elements relative to the object, using the means for bringing the multiple elements into contact,

wherein each of the multiple elements is at least an ultrasound emitting element, and wherein the ultrasound emitting elements are rigid and are assembled to each other mechanically so as to form an articulated structure.

2. (Currently amended) The transducer according to claim 1, in which the transducer can be moved relative to the object to be checked and has a deformable emitting surface formed by first faces of the multiple elements and that will be brought into contact with the surface of the object and ~~starting from which ultrasounds are emitted towards the object, control means being provided to generate excitation pulses of the ultrasound emitting elements,~~ the determination means being designed to define positions of the ultrasound emitting elements relative to the object during displacement of the transducer, the transducer further comprising:

control means for generating excitation pulses of the ultrasound emitting elements;

processing means being provided to for:

a) ~~determined~~ determining, starting from the positions thus determined, delay laws that the ultrasound emitting elements use to generate a focused ultrasonic beam for which the characteristics are controlled with respect to the object, and

b) ~~—apply applying~~ these delay laws to the excitation pulses,

ultrasound receiving elements, possibly constituted by the ultrasound emitting elements, ~~being designed~~ configured to supply signals used to form images related to the object,

~~wherein the means for bringing into contact being provided the elements into contact is configured~~ to bring the ultrasound emitting elements into contact with the surface of the object, and the ~~determination—means~~ for determining the positions of the multiple elements is configured being provided to determine the positions of the ultrasound emitting elements relative to the object through the means for bringing the ~~ultrasound emitting elements~~ into contact.

3. (Currently amended) The transducer according to claim 2, ~~in which~~ wherein the means for bringing the ~~ultrasound emitting elements into contact with the surface of the object comprise comprises~~ mechanical elements, each mechanical element including a moving portion that is free to move relative to a rigid portion of the transducer, a first end of ~~this the~~ moving portion being capable of pressing ultrasound emitting elements into contact with the surface of the object, and ~~wherein the means of for~~ wherein the means for determining the positions of the ~~ultrasound emitting elements relative to the object comprise multiple elements comprises:~~

- first means, ~~provided to determine for determining~~ the positions of the ultrasound emitting elements relative to the rigid portion of the transducer, by measuring the deformation of the emitting surface, and ~~to output for outputting~~ signals representative of the positions thus determined, the first means comprising:

- distance measurement means, ~~provided to measure for measuring~~ the distance between a second end of the moving portion of each mechanical element and an area of the rigid portion of the transducer and
- auxiliary processing means ~~provided to determine for determining~~ the positions of the ultrasound emitting elements with respect to the rigid portion of the transducer, using the distances thus determined,

- second means ~~provided to determine for determining~~ the position and orientation of ~~this the~~ rigid portion with respect to the object and ~~to output for outputting~~ signals representative of the position and the orientation thus determined and

- third means ~~provided to output for outputting~~ the positions of the ultrasound emitting elements with respect to the object using signals output by the first and second means.

4. (Currently amended) The transducer according to claim 3, ~~in which~~wherein the first end of each moving portion is rounded.

5. (Currently amended) The transducer according to claim 3, ~~in which~~wherein the rigid portion of the transducer comprises parallel holes in which the moving portions are respectively free to slide, and each mechanical element also includes elastic means ~~enable~~effor separating the first end of the moving portion corresponding to this mechanical element, from the rigid portion.

6. (Currently amended) The transducer according to claim 5, ~~in which~~wherein each mechanical element also comprises a means for reducing friction for in the hole ~~corresponding to it, in which the moving portion of this mechanical element is free to slide with low friction.~~

7. (Currently amended) The transducer according to claim 3, ~~in which~~wherein the distance measurement means is configured~~are provided~~ to optically measure the distance between the second end of the moving portion of each mechanical element and an area of the rigid portion, and ~~comprise~~comprises:

- light emission means, fixed to the rigid portion, for emitting~~and designed to emit~~ light towards ~~this the~~ second end, ~~this the~~ second end being capable of reflecting ~~this the~~ emitted light, and

- light reception means, fixed to the rigid portion, for receiving~~and provided to receive~~ the light thus reflected, ~~these the light~~ reception means being capable of outputting signals representative of the distance between this second end and the corresponding zone.

8. (Currently amended) The transducer according to claim 7, ~~in which~~ wherein the light emission means and the light reception means include a photo-emitter and a photo-detector respectively, fixed to the rigid portion facing the second end.

9. (Currently amended) The transducer according to claim 7, ~~in which~~ wherein the light emission means include a first optical fiber to transmit light and send the light to the second end, and the light reception means include a second optical ~~fiber~~ fiber to transmit light reflected by this second end.

10. (Currently amended) The transducer according to claim 7, ~~in which~~ wherein the ~~optical~~ distance measurement means ~~use~~ uses continuous light beams.

11. (Currently amended) The transducer according to claim 7, ~~in which~~ wherein the ~~optical~~ distance measurement means ~~use~~ uses discontinuous light beams and particularly trains of light waves.

12. (Currently amended) The transducer according to claim 3, ~~in which~~ wherein the means of bringing the ~~ultrasound emitting~~ elements into contact ~~also include~~ includes a blade that covers second faces of the ultrasound emitting elements, the first end of the moving portion of each mechanical element being capable of pressing ultrasound emitting elements in contact with the surface of the object through the blade, ~~this~~ the blade being capable of distributing forces applied by the moving elements on the emitting elements through the blade.

13. (Currently amended) The transducer according to claim 3, ~~in which~~ wherein the ultrasound emitting elements are rigid piezoelectric elements trapped in a flexible substrate that is passive with regard to ultrasounds.

14. (Currently amended) The transducer according to claim 13, ~~also further~~ comprising strips, the number of which is equal to the number of ultrasound emitting elements and that are fixed to the face of the flexible substrate that is located facing the mechanical elements, each

strip facing the moving portion of one of these mechanical elements, the first end of this moving portion being capable of pressing the ultrasound emitting elements in contact with the surface of the object through the strip facing it.